Big Themes
Where Is Hydrogeology Research Going?

A Perspective of One Hydrogeologist

Jim Barker
University of Waterloo
CANADA

Perspective of a Researcher, not a “Real” Hydrogeologist

Where Are We?

What are the Challenges and so the **BIG** Opportunities?

Where is Waterloo going?

Status of Research in Hydrogeology

- Schwartz and Ibaraki, 2001. Ground Water 39: 492-498.
- Schwartz et al., 2002. Ground Water 40:317-319.
- Schwartz and Fang, 2007. J. Amer. Soc. Info. Technol. 58:518-525.

Analysis of citation of papers

Measure impact not technical quality

Status of Research in Hydrogeology

Analysis of citation of papers

Observations/Conclusions

"The lack of citations of most papers implies their impact is negligible", although "technical quality is likely quite good"

"many papers are obviously DOA (dead on arrival)"

The well known textbook Freeze and Cherry (1979) was the authoritative textbook through 2000

Status of Research in Hydrogeology

Analysis of citation of papers

Observations/Conclusions

"much of the work being published in hydrogeological journals is incremental science that is of limited impact"

As research continues and progresses many of the fundamental/important/impactful problems are solved and "it becomes much more difficult to find impactful problems, leaving researchers a trivial selection of remaining problems"

Where Are We?

Status of Research in Hydrogeology

Analysis of citation of papers

Observations/Conclusions

"trivial in the sense that these details do not affect our basic understanding"

" it is likely that the number of meaningful problems has shrunk"

Where Are We?

Status of Hydrogeology

Practitioners (consultants, regulators, etc.) don't read hydrogeology journals

WHY?

"much of the work being published in hydrogeological journals is incremental science that is of limited impact" "leaving researchers a trivial selection of remaining problems"

So, practitioners have stagnated as well and are not adding value in their work

So, what do we do to “save” hydrogeology research?

What Are the Challenges/Opportunities?

What Are the Useful BIG Themes?

Criteria:

- Challenges Recognized by Society

  People, Commerce, Government

- Potential for us to add value and capture the BIG theme

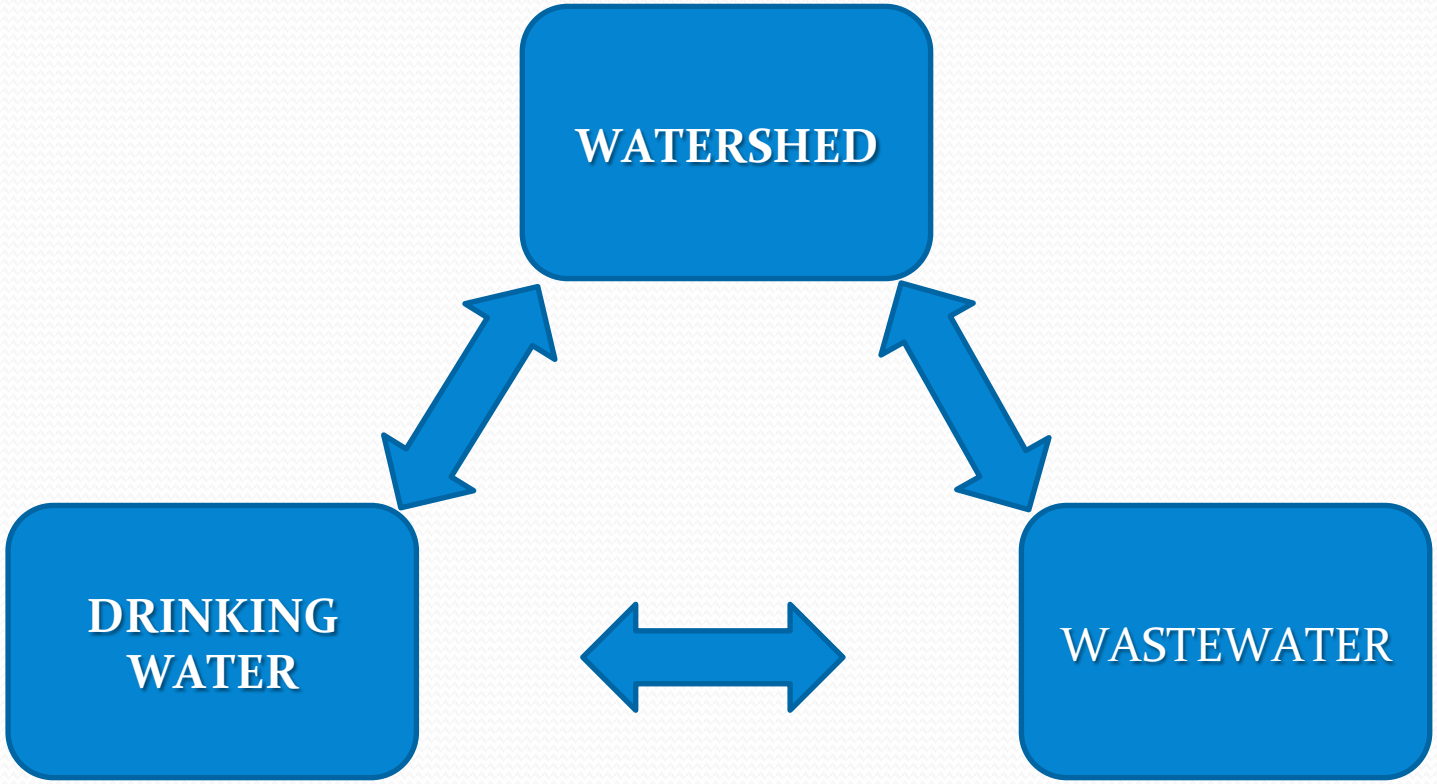
  Where is the hydrogeologist's perspective unique?

Possible BIG Opportunities

- Contaminant Hydrogeology
- Water Supply
- Groundwater – Surface Water Interaction
- **INTEGRATED** Water **QUALITY** Management

What Are the Challenges/Opportunities?

INTEGRATED Water **QUALITY** Management



What Are the Challenges/Opportunities?

Can Hydrogeologists capture this BIG Theme?

The BIG Theme: Integrated Water Quality Management

Is this the BIG theme to capture?

Do you have a better BIG theme we can capture?

Can we capture it?

What Are the Challenges/Opportunities?

Where Is Waterloo Going?

Our Approach: Research and Education Supporting INTEGRATED Water QUALITY Management

- Remain opportunistic
- Respect industrial needs
- Nurture quality people
- Develop real cross-discipline collaboration

Canada Excellence Research Chair in Ecohydrology





The Chair research focuses on the biogeochemistry of soils, sediments and aquatic ecosystems, the cycles of water, carbon, nutrients and metals, global change, geobiology, chemical hydrology, water-rock interactions and environmental modeling.

Where Is Waterloo Going?

THE Water Institute

Innovation in Water Research and Education

Where Is Waterloo Going?

THE Water Institute

- Established in 2009 to "*facilitate excellence in research, education and innovation in water science, technology, management and governance.*"
- Connects 125+ water researchers at UW (INTEGRATION)

the water INSTITUTE University of Waterloo

Collaboration with Brazil

- University of São Paulo (USP) → *interdisciplinary water research & education*
- CETESB, UNESP, USP, ABAS, University of Waterloo, University of Guelph → *groundwater remediation & management*
- Universidade do Extremo Sul Catarinense (UNESC) → *environmental management*

From left, Feridun Hamdullahpur (President, University of Waterloo), Gary Goodyear (Canadian Minister of State for Science and Technology), Edson Luiz Riccio (Director, International Office, University of São Paulo).

Southern Ontario Water Consortium

SOWC: A platform for water innovation in southern Ontario

Making Ontario a Global Leader:

Build a platform for integrated research, development and demonstration in water and wastewater to support economic opportunity.

Platform Components

- Watersheds
- Ecotoxicology
- Drinking water
- Wastewater
- Sensors
- Analytical Techniques

→ Integrated Data Management

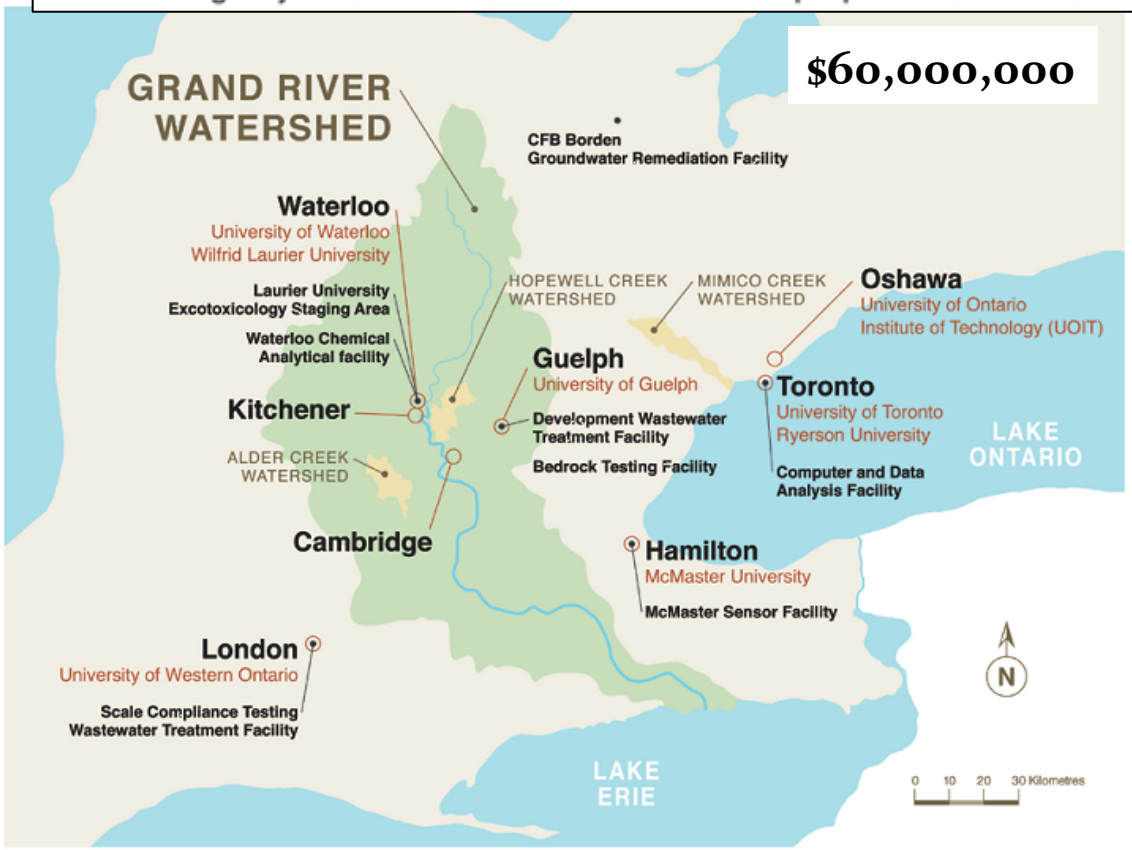
Southern Ontario Water Consortium

Federal Economic Development Agency for Southern Ontario
Agence fédérale de développement économique pour le Sud de l'Ontario

IBM

Ontario

$60,000,000



Wilfrid Laurier University

UOIT

University of Guelph

McMaster University

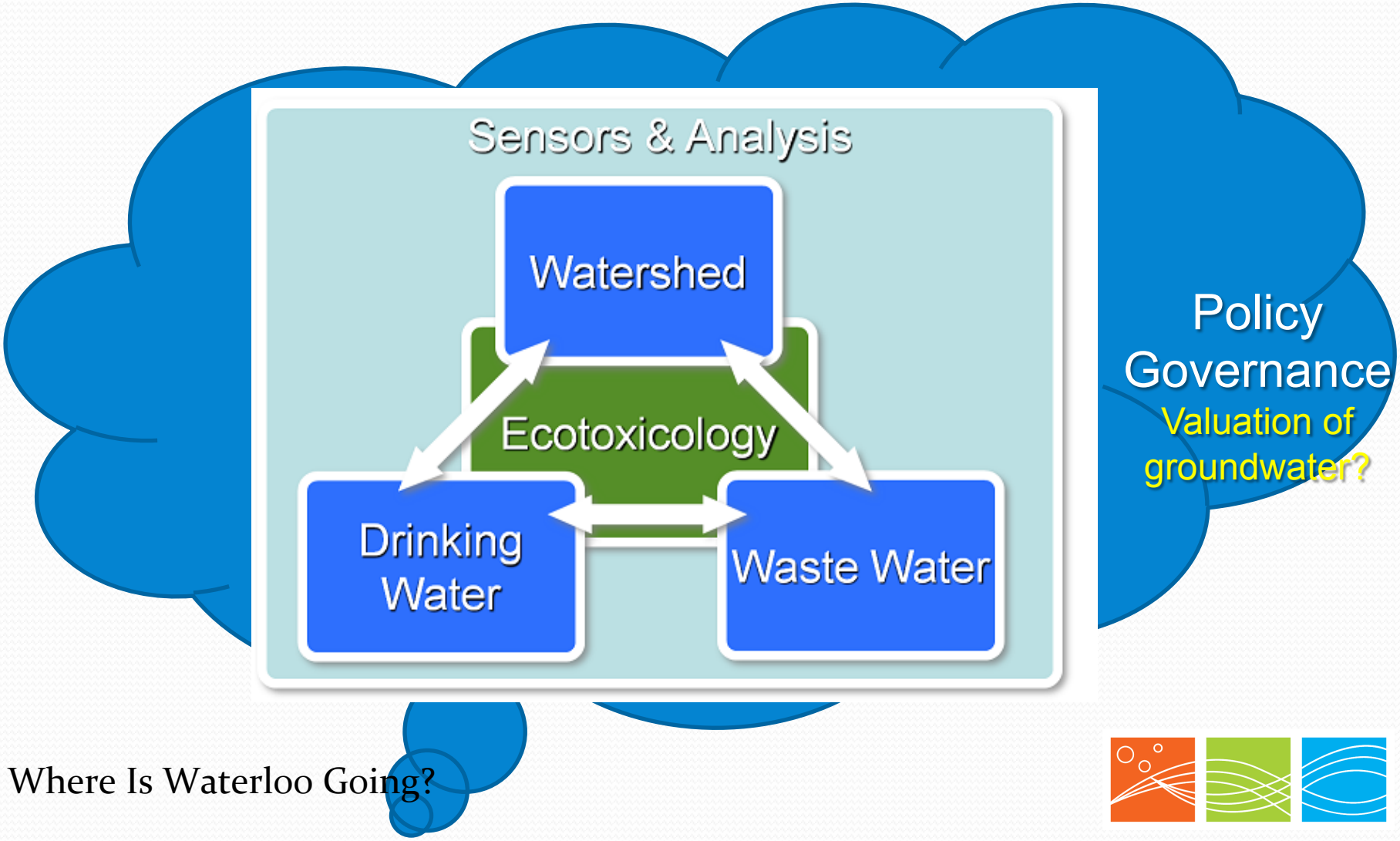
University of Toronto

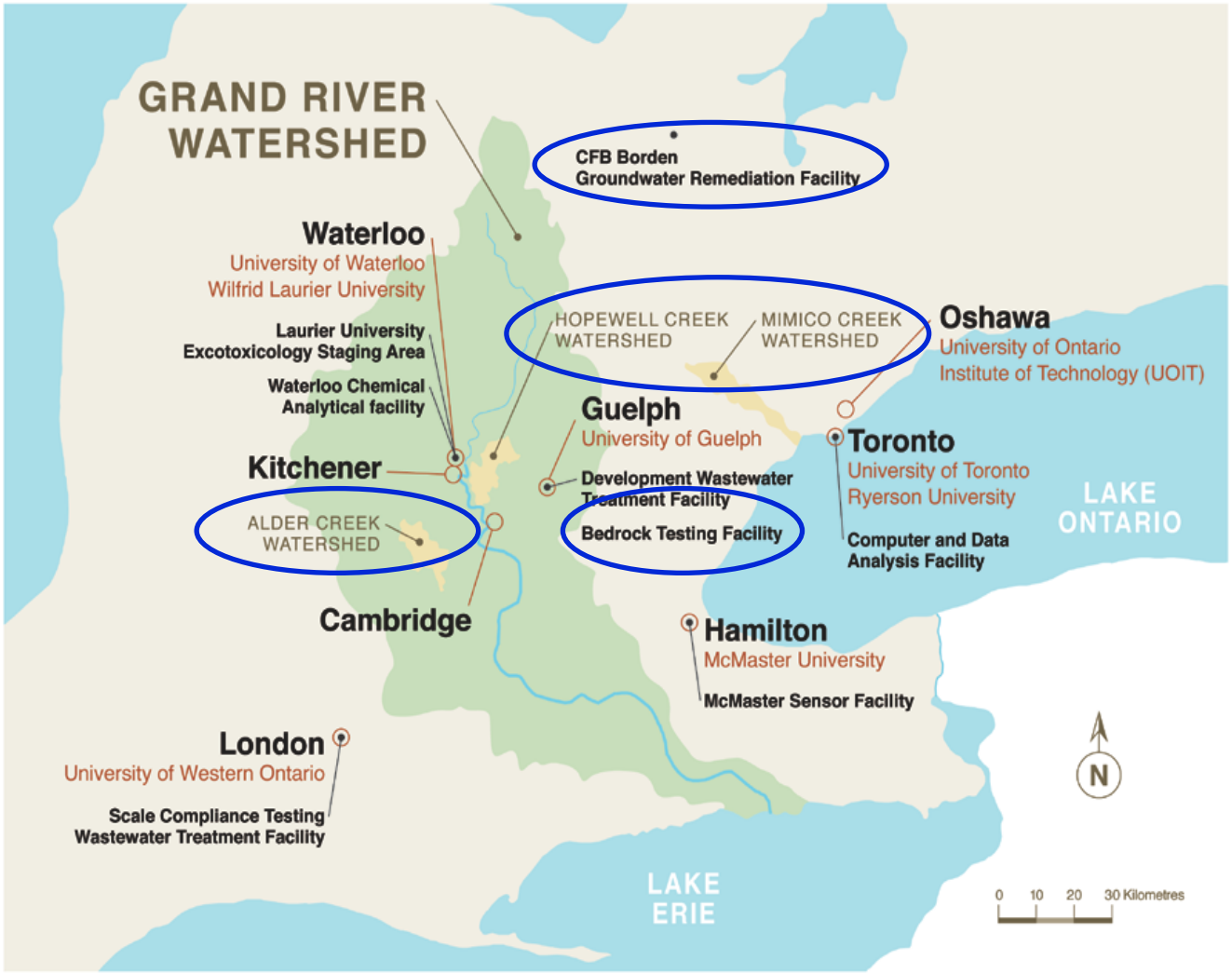
Western

Ryerson University

University of Waterloo

SOWC: A Platform for **INTEGRATION**





Where Is Waterloo Going?

The SOWC anticipates 3 basic models for use:

- Collaborative/contract R & D between private or public sector organizations and university based researchers.
- Private sector use of the platform facilities supported by the consortium's technical staff.
- Academic research on the platform supported by the consortium's technical staff.

Waterloo's BIG Theme

Providing the Research and Education Supporting **INTEGRATED** Water QUALITY Management

1. Canada Excellence Chair in Ecohydrology
2. THE Water Institute
3. Southern Ontario Water Consortium